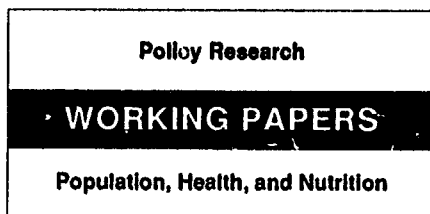


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Population Growth, Externalities, and Poverty

Nancy Birdsall
and
Charles Griffin

The two major arguments for fertility reduction involve externalities and income redistribution. The implications of the two arguments for policy are the same — both require behavioral change by the poor. Their behavior is most likely to change if the change improves their welfare — which should therefore be the focus of population programs.

This paper — a joint product of the Office of the Director, Policy Research Department, and the Population and Human Resources Operations Division, Eastern Africa Department — is part of a continuing effort in the Bank to assess the implications for poverty of various sectoral and economywide policy changes. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Ella Hornsby, room J10-206, extension 35742 (July 1993, 26 pages).

Birdsall and Griffin review the implications for social policy in developing countries of two major justifications for fertility reduction: the externality argument and the income redistribution argument.

First they set out the arguments. In terms of how policy affects the poor, they show that the implications of the two different arguments are virtually identical. Both imply that the only reasonable way to view policies to reduce fertility is as activities in which one segment of society (the rich) is offering another segment (the poor) compensation to elicit a change in behavior.

Where there are true externalities, the rich may also end up as well or better off in terms of income than they were, because everyone can benefit from the overall efficiency gain.

Where there are not true externalities, the poor are made better off in the sense of real income while the rich gain in terms of utility by financing the necessary social programs.

Birdsall and Griffin outline briefly the program implications of this "welfare" approach: more emphasis on a package of targeted social programs, and more emphasis in family planning services on client welfare and contraceptive choice.

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Population Growth, Externalities and Poverty

by

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and

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I. Introduction

Rapid population growth in developing countries is the basis of one or more of a number of concerns, both in the popular and in the scholarly literatures. Some of these concerns are:

- o that rapid population growth reduces the rate of economic growth by, for example, reducing investment in human and physical capital; 1/
- o that rapid population growth has negative externalities, 2/ leading in some scenarios to degradation of natural resources at the national level or contributing to such environmental problems as global warming;
- o that rapid population growth has negative "pecuniary" externalities, i.e., that it reduces the incomes of some groups, particularly the poor, compared to other groups and therefore exacerbates the problem of poverty in developing countries.

The first concern has been amply explored for at least two decades; its merits are difficult to address empirically. In the absence of compelling evidence it remains a matter of controversy. 3/

1/ The classic presentation of the argument is that of Coale and Hoover (1958). See Birdsall (1988) for a review of the literature on the economic consequences of rapid population growth in developing countries.

2/ Some argue that population growth may have positive externalities. While we do not dismiss that possibility, in this paper we are concerned with the implications of possible negative externalities.

3/ In addition to the citations in footnote 1, see Kelley (1988), World Bank (1984), National Research Council (1986), which in turn cite hundreds of earlier studies and reviews.

Economists have recently noted, in any event, that in the absence of externalities, a negative effect of rapid population growth on economic growth need not in itself be of great concern. Parents may fully realize that children are costly to them (and to society), and yet prefer to have more children rather than higher consumption of other costly things. 4/ If so, rapid population growth may be socially optimal even if it impedes economic growth. There are some countervailing arguments, however. Recent new approaches to growth theory emphasize the possibility that investments in human resources may be a more important contributor to growth than heretofore believed and that there may be positive externalities associated with such investments. To the extent that rapid population growth inhibits such investments, its effects on growth may not be socially optimal. 5/

In any event, in this paper we do not consider further this first concern. Instead we concentrate on the policy implications of the two other concerns: negative externalities of rapid population growth and effects on income distribution (and thus on poverty). 6/ We are concerned in particular with the implications for the poor of the various approaches to population policy that arise from these two concerns. In Section II we set out briefly the two concerns, using simple graphs to

4/ Lee (1991) sets out this point clearly. He notes that Demeny, in 1972, pointed out that to decry such a decision on parents' part would be like decrying people's decision not to work on Sundays on the grounds that it reduces their incomes.

5/ See Romer (1986) and Azariadis and Drazen (1990) on sources of growth including such externalities to human resource investments.

6/ Some readers may find the distinction between the negative externality argument and the income distribution argument, as each is characterized in this paper, somewhat artificial, since both concerns point to the need to improve social welfare through population programs. But the authors believe it is useful to understand the differing motivation and meaning of the two arguments as well as the fact that they lead to the same end.

illustrate how each can be translated into a rationale for some sort of population policy. We note that in terms of policy as it affects the poor, the implications of the two different approaches are virtually identical. In Section III we discuss the implications of these two concerns for the structure and content of programs to reduce fertility -- in this context we review education, health and family planning programs; effects of family planning on women's welfare; expansion of contraceptive choice; and the use of incentives to reduce fertility. We conclude with an assessment of the importance to the future success of fertility reduction efforts of taking a fundamentally redistributive approach to population policy, -- an approach in which one segment of society (the relatively rich) offers another segment (the relatively poor) additional resources -- irrespective of the specific rationale for the policy.

Section II. The Externality and Income Distribution Approaches

Negative Environmental Externalities

Negative externalities to childbearing arise if there is a divergence between the private and social costs of children, i.e., if one couple's childbearing decisions imposes costs on other families. ^{7/} In a recent paper Lee (1991) sets out a framework for considering empirically such externalities. He concludes (with great caution -- he notes that the numbers are rough and the exercise is experimental) that externalities are not so great nor always in the expected direction -- they are not always negative for developing countries. However, as Lee himself points out, he does not include any estimate to account for externalities arising from

^{7/} In the World Bank's 1984 World Development Report, this divergence between private and social costs provided an important justification for government programs to reduce fertility.

renewable common property resources (what we will refer crudely to as environmental externalities). ^{8/} In addition, since he undertakes the analysis using countries as the unit of analysis, he is unable to take into account environmental externalities arising at the global level.

Yet negative environmental externalities, at the global and national level, are increasingly alluded to as a rationale for efforts to reduce population growth in developing countries. Though on a per capita basis, the fossil fuel emissions that currently contribute to possible global warming are much greater in industrialized countries, rates of increase in income and in population are likely to be greater in developing countries, implying that the contribution of these countries to global emissions could rise from about 20% today to 50% by the middle of the next century. At the national level, the combination of poverty and rapid population growth is often cited as contributing to environmental degradation, for example because population pressure leads to farming of hillsides and other marginal areas (causing soil erosion) or heavy cutting of forests for fuel (causing damage to watersheds, hence to agriculture, and contributing to possibly irreversible reductions in biodiversity).

Figure 1 illustrates how these externalities (and we are assuming their existence at this point) can justify a policy to reduce fertility and thus population growth. The figure shows a production possibilities frontier in a two-good world that produces environmental services and food. Greater food production comes at a cost to the environment in this simple world, at an increasing rate as environmental

^{8/} Lee also assumes that the population is homogeneous, i.e., that all members have the same constraints and preferences (thus not taking into account, for example, the possibility that differences in the tax burden and the incidence of public expenditures imply transfers from one portion of the population to another).

services are traded for more food. A country may find itself inside the frontier, at a point such as M, because of fast population growth that threatens both the production of food and of environmental services.

A program to reduce fertility is justified because a developing country is

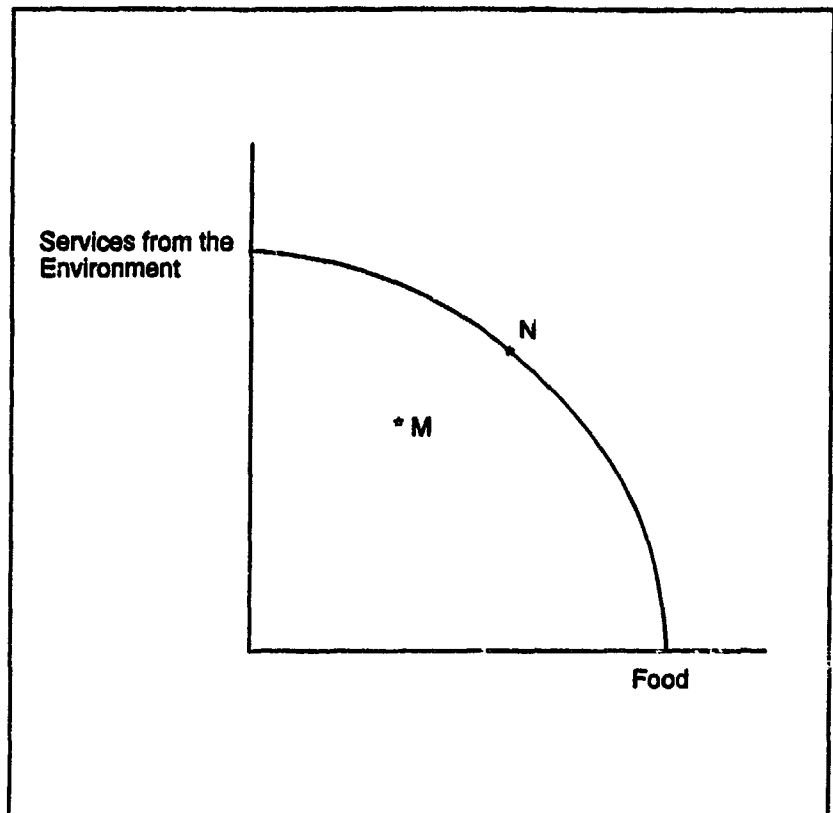


Figure 1 Illustration of Externality Argument

somewhere inside the frontier, such as at point M, and it is inside the frontier because parents (especially poor parents, an issue we explore further below) are having more children than is optimal for the country as a whole. In this example, parents are not taking into account the economic costs to their country associated with high fertility, population pressure and resulting environmental degradation. ^{2/}

If such a country could, through a population program, induce parents to have fewer children, then that country could move out to a point such as N on the production possibilities frontier. With smaller families,

^{2/} There may be other reasons why poor parents are having "too many" children. Some of these we discuss below. Here we are concentrating on the simple example of a negative environmental externality.

output 10/ would rise and the country as a whole would be better off.

Analogously, if we consider a global society, if industrialized countries could induce developing countries to reduce their fertility levels, then global welfare could increase.

The question is then how to induce people to have fewer children. We are assuming (for the moment) that people are having the number of children they wish; there is no excess or unwanted fertility, even among the poor. With the population problem rooted solely in these so-called environmental externalities, inducing lower fertility requires that the external costs of children be somehow imposed on parents (reducing their demand for children), or, to put it another way, that the constraints parents face be somehow altered in a manner that raises the cost of children to them.

There are several ways to do this. A tax on children 11/ would reduce the demand for children, and a tax-financed incentive for not bearing more children would have the same effect. Although taxes or cash incentives to reduce fertility have been used in some countries (Singapore and Bangladesh, for example 12/), they are politically unpalatable in many countries. 13/ Moreover, incentives designed to correct for

10/ In this example, it is probably more accurate to say the present discounted value of long-run output will increase. Short-run output could decrease while environmental problems are addressed.

11/ I.e. a Pigovian tax to address the specific source of externality-inducing behavior.

12/ Payments in Bangladesh, however, are provided only for permanent methods and are very low, designed to compensate for the time and discomfort of the procedure itself.

13/ Subsidies or positive incentives to encourage high fertility are more common, having been used in France and parts of eastern Europe, and are obviously a form of incentive that is politically acceptable.

negative externalities, which could in principle be structured to be less regressive than taxes, raise other problems, such as entrapment. ^{14/}

More often discussed are other interventions which, in the presence of negative externalities, governments may use to alter individuals' fertility behavior, and particularly fertility behavior of the poor who tend to have more children, especially in developing countries, than the nonpoor. Successful interventions tend to involve changes for the better in the situation of the poor: expanded opportunities for women, better health for their children, ready access to family planning, education programs that attract children into school and keep them there, and programs that help parents substitute for the income-earning capabilities of children, reducing the value of children as a source of immediate income and old-age security. These changes in the parents' situation affect demand for children by raising the "price" of children to parents. ^{15/} All such programs are essentially investments in the human capital of mothers and children, or poverty alleviation activities.

^{14/} Entrapment occurs if an individual is induced, for example due to myopia or desperate poverty, to take an irreversible step he or she later regrets. It has been discussed in the context of cash payments to persons who are sterilized. See Chomitz and Birdsall, 1991, where the justification for and welfare implications of incentives to reduce fertility, as well as of child taxes and child quotas, are discussed. They conclude that incentives to correct for failures in the market for information about contraception have potential in many developing countries, but that incentives to correct for externalities are harder to justify, would probably involve larger financial amounts, and raise a number of difficult ethical issues.

^{15/} For discussion of these policies as interventions to reduce fertility, see World Bank (1984). It may be counter-intuitive but is easily demonstrated that interventions that would improve the lives of people, such as education and lower mortality, will increase the "price" of the quantity of children by raising the cost of inputs required to rear children, such as the opportunity cost of parents' time; see Becker and Lewis (1974).

These programs tend to have the same effect as taxes on children, but they work indirectly and have the desirable characteristic of succeeding by raising the "quality" of children. They do need to be financed, presumably through taxes. The rich, who would presumably bear the tax burden of these programs, are likely to do so because they can also gain income -- as the lower average fertility permits the society to move from point M in figure 1 to the frontier, generating additional output.

The fundamental point, to which we will return, is that a change in the fertility behavior of the poor requires a change in their situation, i.e., a change in the relative prices they face. The poor will voluntarily choose fewer children only if the change in their situation makes them at least as well off as they are currently. ^{16/} Any other approach would have to include an element of compulsion; otherwise the poor have no reason to alter their fertility behavior (and to help society to move away from the suboptimal point M in figure 1.)

Similarly, a change in the fertility behavior of poor countries is unlikely unless there is a change in the circumstances that induce high fertility in those countries. Thus it may be in the interests of the citizens of rich countries to "purchase" lower fertility in poor countries by financing changes such as more educational opportunities in poor countries. To the extent that these changes move the global society from point M to point N, all countries can be better off. ^{17/}

^{16/} Note that the determination of welfare is what the poor think makes them better off, not what others believe should make them better off. A compulsory population program that is imposed on the poor and that provides no compensation to them applies a low weight to their perception of what makes them better off.

^{17/} It should be noted that figure 1 contains no information about the distribution of output gains between rich and poor if a society (or the world) succeeds in moving from M to N.

Income Distribution and Poverty

In this section we assume away the pure externalities referred to above and consider only the problem of "pecuniary" externalities, i.e., the negative effect of rapid population growth on income equality and thus on the poor. Rapid population growth can worsen the distribution of income in developing countries and it probably exacerbates the problems of the poor. At the aggregate level, rapid growth of population increases the availability of labor in an economy relative to land and physical capital, reducing wages. 18/ This is likely to worsen inequality and hurt the poor, who are more reliant on labor income. Moreover, there is evidence that unskilled, but not skilled laborers, suffer a relative decline in wages if they are members of a large cohort. 19/

At the family level, poverty and high fertility seem to form a vicious circle. As we point out in an earlier paper 20/, high fertility contributes to poverty. It strains the budgets of poor families, reducing available resources to feed, educate and provide health care to children. With households classified by per capita income in Brazil, Colombia, Malaysia and rural India (data from the 1970s), the ratio of income per child in the richest households to that in the poorest ranges from about 12 in rural India to more than 100 in Brazil. 21/ A study of families with twins in India found that the additional unexpected child

18/ Note that although wages are depressed in this scenario, rents and profits are boosted. High fertility is therefore potentially Pareto superior to low fertility, assuming that there were a mechanism for redistribution of some of the rents of landlords and capitalists (Ng, 1986; Willis, 1987).

19/ Behrman and Birdsall, 1988, show this for males in Brazil.

20/ Birdsall and Griffin, 1988.

21/ Birdsall, 1988; or Birdsall and Griffin, 1988.

represented by twins reduced enrollment levels of all children in the household. 22/ Estimates based on Malaysian data show that couples with a higher biological propensity to have births (higher fecundity or supply of births) are also characterized by lower schooling attainment for their children. 23/

At the same time, a massive literature has shown repeatedly that many characteristics of poor households contribute to high fertility -- high infant mortality, lack of education for women, too little family income to "invest" in children, and inaccessibility of family planning services. 24/

How can it be that poor parents persist in having many children if it tends to exacerbate their problems? For simplicity the answer can be divided into two categories.

Unwanted Fertility. First is the simplest explanation: that some fertility of the poor is unwanted. In many countries there are significant proportions of women who say that they would like to limit their fertility, yet do not do so. This condition of "unmet need" (as defined and measured by demographers) characterizes a quarter of married fecund women in Bangladesh, one-fifth in Nepal, one-eighth in Egypt. 25/ However, the phenomenon of "unmet need" does not imply that

22/ Rosenzweig and Wolpin, 1980.

23/ Rosenzweig and Schultz, 1987.

24/ Studies on the determinants of fertility are reviewed in Birdsall, 1988. See also World Bank, 1984. Birdsall and Griffin, 1988, review the evidence that reduced fertility, including among the poor, is associated with lower infant mortality, more educated mothers, better educational opportunities for children, and better access to family planning services.

25/ Boulier, 1985.

parents are acting irrationally. Chomitz and Birdsall (1991) set out a number of market failures, including of credit, insurance and information markets, that explain why individuals may fail to use contraception even when they want no more children; these are all possible barriers to the optimal use of contraception from an individual's or couple's point of view. In fact, demographers use the term "unmet need" to signify would-be demand for contraception were the price of contraception zero (including psychic as well as monetary costs). Yet the price of contraception is never, of course, zero. The credit, information and other constraints that keep the price well above zero tend to affect the poor more than the rich, and the direct costs of contraception for the poor represent a larger fraction of total resources, both human and financial, available to them.

The implication for population policy of the existence of unwanted fertility is obvious -- subsidized family planning services targeted to the poor. As was the case above, when we were assuming that negative externalities exist, so-called unwanted fertility is likely to persist unless there are changes in the situation the poor endure -- indeed not only better access to family planning but improvements in their access to capital, to information, and to complementary services such as health and education. In short, even assuming there is "unmet need," it is still the case that a change in the fertility behavior of the poor requires a change in their circumstances -- including at the least better access to family planning services. 26/

26/ Family planning services, if of reasonable quality, have certainly contributed to lower fertility, though they are most effective in settings where women are reasonably well educated. In Bangladesh, where women's education is low, contraceptive use rose from 14 to 31 percent in the 1980s, and the total fertility rate fell from 6.3 to 4.6. (Ahmed 1987; Griffin 1989)

Endogenous Altruism and the Welfare of Children. Our second explanation for the high fertility of the poor is based on the possibility of a distinction between the welfare of parents and the welfare of children. Above we noted, in a different context, that parents may reasonably trade off higher consumption of other costly things in favor of more children. Consequently, even if high fertility impedes economic growth it may still be socially optimal in that lower fertility would reduce the utility of parents. But what if this tradeoff is chosen by poor parents without full information about the costs of this high fertility for their children? Suppose parents trade off more children against more education per child -- unaware that the returns to education are rising? Suppose parents "choose" additional pregnancies because they fear that some of their current children will die -- unaware that child mortality is rapidly falling?

Or suppose that parents' degree of altruism toward their children is in fact endogenous, e.g. that altruism toward children is itself a positive function of income -- a luxury only the relatively well off can afford? ^{27/} Parents, in their own desperate poverty, may choose more children because children seem critical to their own survival -- in the process trading off some small measure of additional welfare for those children they already have. This decision would seem

^{27/} Nerlove et al. (1987) show that if parents do not care about their children, an intergenerational externality will not exist. However, in the more likely case that parents do care about their children, an intergenerational externality can arise because their altruism drives a wedge between the private and social costs of additional children. Altruism by parents (or caring about their progeny) enters through the utility function and is consequently subject to the usual concavity restrictions. People with higher incomes can afford to be more altruistic because the amount of altruism "purchased" is dependent on income, just as purchases of other goods would be.

likely, even necessary, in the case of parents with three or four daughters in a society where only a son can provide reasonable security in old age. ^{28/} In short, though high fertility of the poor worsens the situation of society (the global environmental externality) and even the situation of poor families as a group (the pecuniary externality, i.e., that the wages of unskilled labor fall), each individual poor couple might well be better off with many children--who can earn more than they consume and provide some security in old age -- even though the children themselves are not better off.

Figure 2 illustrates the case in which the problem of externalities does not arise. The figure shows the distribution of welfare in a two-person society, in which in the absence of externalities, the society is on its production frontier (such as at point N in figure 1). We are treating the two people as composite populations of the rich and the poor. The rich are assumed to prefer smaller families (including smaller families for the poor), and the poor are assumed to prefer larger families. The two utility possibilities frontiers (UPF_1 and UPF_2) correspond to two different policy regimes, e.g., UPF_1 , with no social programs for the poor, favoring utility of the rich, versus UPF_2 , with social programs for the

^{28/} A second type of argument, based on the quantity-quality tradeoff, leads to the same conclusion. Higher quality (healthier, better educated) children may be valued by parents, but they are costly. In developing countries, children enter the budget constraint on both the expenditure and the income sides because they can add to family income. At low levels of family income it is possible that, even though the quality of children is an important consideration, families are so constrained by their low income that short term survival leads to more weight being placed on children's incomes, however low, than on spending for child quality. Thus, just because parents care about their children the result may not be behavior that is entirely in the long term interests of the children. Poor parents must make difficult choices as they juggle a number of contradictory objectives.

poor, favoring utility of the poor. Each utility frontier shows all possible utility distributions associated with some point on a production possibilities frontier.

Suppose that UPF_1 , with no service programs, is the current situation, and the current distribution of goods

is shown by point X_1 , corresponding to U_1^P utility for the poor and U_1^R for the rich (presumably the rich are a much smaller group). Suppose a social program, e.g. education or family planning, is proposed that will reduce the number of children born to the poor while maintaining them at no less than the same utility level they achieve now, with their (currently) larger families. The social program is financed by taxing the rich. ^{29/} Such a reallocation corresponds to UPF_2 , where the rich are willing to finance the new program, requiring society to produce a bundle of goods

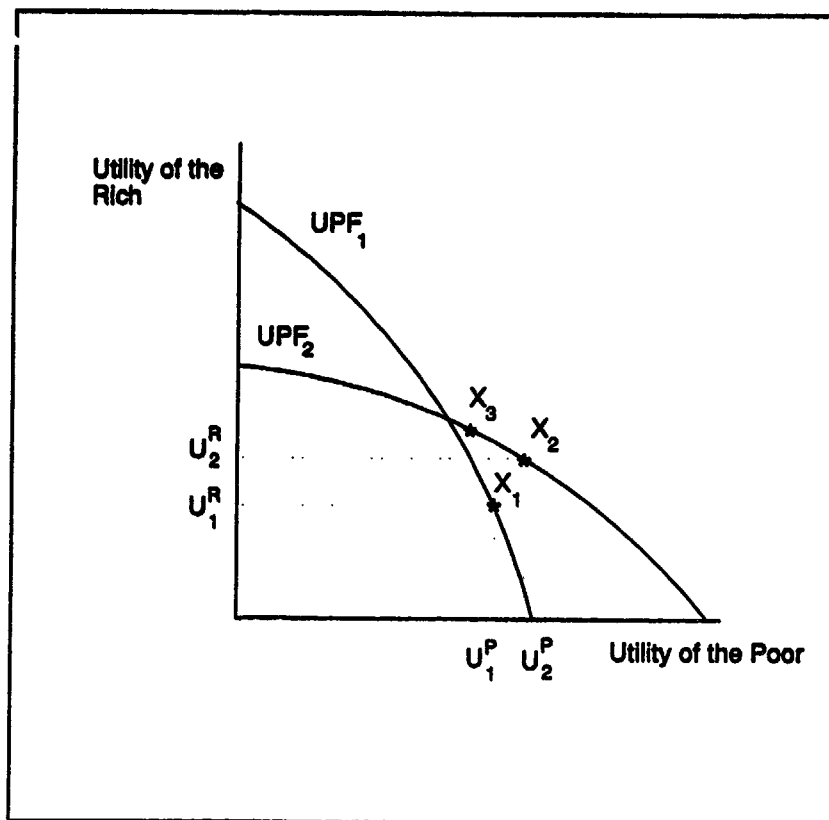


Figure 2 Illustration of Social Welfare Issues

^{29/} We are assuming here that the burden of taxes is borne by the rich. This is more obvious if we consider transfers via international aid programs as taxes on the rich countries.

that reduces the potential maximum utility of the rich and increases the potential maximum utility of the poor. 30/

Suppose that the social program moves society from X_1 to X_2 . Both the rich and the poor would enjoy an unambiguous increase in actual welfare (from U_1^p to U_2^p for the poor and from U_1^r to U_2^r for the rich). The rich secure higher utility for themselves, given they prefer smaller families among the poor, by financing the social programs through taxes. 31/

All this approach tells us is that in the absence of true externalities, noncoercive programs that reduce fertility are,

30/ We make a distinction between potential and actual utility. The maximum potential utility of the rich drops as we move from UPF_1 to UPF_2 , which is seen by the drop in the y-intercept. The converse is true for the poor, as seen in the increase of the x-intercept between the two regimes. The reason is that society, through the social programs we have posited, has chosen to give up some goods that the rich would enjoy consuming in order to provide basic services needed by the poor. Actual utility is shown by the X's in the graph. The rich give up potential utility because doing so increases their actual utility, from X_1 to X_2 (or X_3). Actual utility increases because, in this example, the poor have fewer children as a result of the social programs, which is valued by the rich. It is almost incidental that a noncoercive approach to social policy means that society must move northeast from X_1 , a region where both the rich and the poor are at least as well off as before the program is instituted.

31/ E.g. taxpayers in industrialized countries finance programs in Africa or South Africa to reduce fertility, through bilateral aid.

fundamentally, income redistribution programs. ^{32/} In practice, this is the same result one would get under the externality argument as presented in the previous section if noncoercive policies are followed under that alternative justification.

Section III. From Theory to Practice

Whether the fundamental problem is one of externalities, prevalence of unwanted fertility among the poor, or endogenous altruism, the implication is the same. An interest in reducing population growth requires that policies be designed to keep the poor at least as well off as they are now, but with fewer children. This "welfare" approach, i.e. emphasizing the need to at least maintain the current welfare of the poor if fertility is to fall, puts three issues into perspective:

- o If there is a divergence between where the world is in terms of population growth and where it would like to be, noncoercive policies can move us closer to the optimum.

^{32/} Note also that society may care about income distribution and poverty per se, and prefer a more to a less equal distribution and less poverty to more poverty. If this is so, it strengthens the argument for fertility reduction programs defined in the broad sense that we have used. Reducing the fertility of the poor as a means to reduce poverty may be preferable to direct income transfers, and it may be less likely to introduce perverse incentives (e.g., for labor supply). However, the argument that the maximum point of social welfare depends on equity as well as efficiency is a problematic one. There is no consensus that a social welfare function could be identified for a specific society, what information it would convey to us in a practical sense, whether it is possible to aggregate individual preferences regarding equity to arrive at any consensus about income distribution, and what types of interpersonal comparisons of welfare could be defended and acted upon through public policy. Of course, despite these reservations, income distribution decisions lie at the base of most public policy decisions, which are made all of the time.

- o A population policy will have a short-run cost to someone; (if there are externalities, the long-run benefits will outweigh the costs). One option that is consistent with the externality approach in figure 1 is to implicitly or explicitly tax children. But child taxes would be regressive and difficult to collect from the poor. The alternative is to introduce programs and policies that will improve the situation of the poor. The rich are likely to pay through taxes for these programs.
- o Even if there is difficulty justifying population programs on the basis of negative externalities to rapid population growth, that does not mean that the programs cannot be justified. There may be redistributive social programs that will improve welfare overall; the rich are willing to finance these programs because they benefit in a welfare sense from the effect of the programs on the fertility of the poor (figure 2).

In short, in an extension of the ideas and literature discussed in an earlier article (Birdsall and Griffin 1988), we believe valid arguments can be made from either the externality or the income distribution approach for programs whose fundamental purpose is to reduce fertility by improving the lives of the poor.

What are the implications of this view for the structure and content of programs to reduce fertility?

Incentives and Fertility Reduction 33/

Cash-based tax or subsidy programs would be an economist's first choice in solving the problem under either scenario. It should be

33/ See Chomitz and Birdsall (1991) for a formal discussion.

clear that taxes on children or cash incentives for not having children are a mechanism by which society assures that any negative externality associated with high fertility (figure 1) is internalized by parents. It should also be clear that a program that uses cash or near-cash compensation -- something like direct cash, a retirement annuity, a guaranteed opportunity of college for two or three children, or health insurance -- to maintain the poor parents' welfare, is consistent with the compensation principle implicit in figure 2.

However, such subsidies or compensation are more typically tied to specific goods and services, such as social services, because cash payments to reduce fertility are often impractical and in most societies are difficult to design in a manner that is ethically acceptable. As a consequence, we do not pursue the cash payment approach any further and consider only redistribution through social programs.

Targeted Social Programs

There is a large body of evidence summarized in Birdsall and Griffin (1988) that high infant mortality, lack of education for mothers, low educational opportunities for children, and poor access to family planning services, all contribute to high fertility, both directly and indirectly.

When high infant mortality rates fall, they afford mothers for the first time the choice of how many children to bear. In a high mortality, traditional agricultural environment, a risk-averse family must produce children almost continually during the reproductive years to guarantee an adequate number of surviving children (particularly if gender is an issue to parents) to provide farm labor and security in old age. As infant mortality drops, the probability that investments in higher quality

children will be lost through death also falls, allowing the price of children to begin rising. The lag in a response by parents to these changes may be several years, but it happens.

More education for women delays marriage, increases the likelihood that contraceptives will be used (and used effectively), boosts the probability that babies will survive and be healthy, raises female labor force participation (hence other economic opportunities for women), helps women to gain more control over the decisions that affect fertility, and endows them with the ability and interest in purchasing more education for their own children. Each of these effects tends to decrease fertility.

More education for children raises their cost for parents and also increases the quality of surviving children. This is true whether parents pay directly for schooling or if it is provided free by the state. The household in the latter case loses economic services otherwise provided by children. The direct costs of education, which are in practice substantial in developing country households even if education is provided by the state, are multiplied by the number of children, so the cost (of education or quality) to a family rises in a multiplicative, not additive fashion, as more children are born. Education costs alone can create very large incentives for poorer parents to reduce the number of children that they raise.

Availability of family planning services of reasonable quality lowers the cost of fertility control, making such control easier all other things the same. Appending a family planning program to a social welfare system that delivers few if any health or education services to the poor is unlikely to produce meaningful results once the "unwanted births" are eliminated. However, a combination of family planning services with

effective health and education services has been shown to be more successful in reducing fertility than providing only the former or the latter (Wheeler 1985).

The implication is obvious. Health and education programs targeted to the poor in developing countries are one way to reduce fertility. Complementing these with targeted family services assures that the poor can translate reduced demand for large families into fewer births. The total effect will exceed the sum of the individual effects because of known complementarities among the three services. A package of services is an effective and eminently sensible method to compensate poor families in a way that results in lower fertility.

In the same spirit, family planning programs themselves could be reconstituted to accent their welfare-enhancing aspects. A family planning program designed to enhance the welfare of the poor client would be part of a set of services to improve the mother's health, the safety of the birth process, and the health of her children. Nutrition supplements would almost certainly be provided to poorer women (and their babies), who are the main targets of such programs. Helping mothers to space or delay births would be integrated with these other services. Contrast this approach with one, until recently common in South Asia, in which a family planning worker's success was measured by increases in the number of sterilizations performed, new acceptors recruited, or contraceptives distributed. Such a worker had every incentive to avoid pregnant women, for example, who would be a prime target of a welfare-enhancing program.

Broader Contraceptive Choice

Probably the most pressing issue in the design of family planning systems from a welfare standpoint is the narrow focus on

sterilizations of some programs, particularly in South Asia. This narrow focus is the result of the long period during which family planning programs in South Asia were designed with demographic targets in mind -- and thus without a clear welfare objective.

In India, for example, contraceptive prevalence from all methods was 35 percent in 1980, compared to 14 percent in 1970. However, almost the entire increase in prevalence was due to sterilizations, condoms, and traditional methods. Among 60 percent of contracepting couples, at least one partner was sterilized. Less than 5 percent used IUDs or birth control pills, and the remaining couples used less effective methods. In fact, the proportion of users of IUDs and pills methods fell over the decade.

Older women at the end of their childbearing years are the principal demanders of sterilizations; consequently, the impact on fertility of permanent methods, although initially large, may be small over the long run for the investment required. For India in 1980, 38 percent of married women between the ages of 35 and 39 were sterilized, compared to 4.5 percent of those between 20 and 24, and 18 percent of those between ages 25 and 29. In contrast, the highest frequency of condom and pill use was among the two younger groups, although in absolute terms it was minuscule even among them -- less than 2 percent. About 40 percent of women with 4 children were sterilized, compared to 16 percent with 1 child, another indicator that women are careful to use permanent methods late in their reproductive lives. (Stout 1989).

Without good access to temporary methods, younger women cannot benefit from the possibility of planning the timing as well as the number of births, nor from the larger welfare benefits associated with reduced

uncertainty in their own lives. A program oriented to younger women would also deliver services valuable to older women, but the converse of that statement is less likely to be true.

Women's Welfare and the Timing of Births

As the above illustrates, a population program aimed at welfare enhancement as well as fertility reduction is more likely to be shaped by the particular needs of important groups of clients. The most obvious such group is women.

Access to effective fertility control methods, because it provides women with reliable control over their reproductive lives, allows them to make reproduction predictable and thus to approach economic life with fewer random fertility shocks and on a more level playing field with men. Birdsall and Chester (1987) argue, for example, that the relatively low status of women in Japan compared to women in other developed countries is partially a consequence of their heavy dependence on condoms and abortion to control fertility. The reason for their low status is not high fertility itself -- Japan's fertility level is among the lowest in the world -- but the probability of unplanned pregnancies, which is higher for Japanese women than for their counterparts in other similar countries who use more reliable means of control. Birdsall and Chester argue that family planning programs, even as they may be dependent for success on women's status, are also likely to enhance women's status substantially.

This positive and independent effect of family planning on the welfare of women, is not only, however, simply a rationale for offering family planning programs. It is also the basis for a program strategy that has a particular orientation to the control of timing of births. Such an orientation implies a contraceptive mix aimed less at meeting state targets

for number of births averted and more at a mix that increases a woman's ability to manage the number and frequency of births she experiences.

(Moreover, it is not obvious that the former strategy would result in fewer births than the latter. A program aimed at helping women space births or delay the first birth can reach any population growth targets planned; more important, it is much more likely to contribute to a revolutionary change in society's views of the entire reproduction process, and in the long run, therefore, to major fertility decline.)

Section IV. Conclusion

We have tried to suggest that no matter what the source of one's interest in population programs, the only reasonable way to view them is as activities in which one segment of society (the rich) is offering another segment (the poor) compensation in order to elicit a change in behavior. Where there are true externalities (figure 1), the rich may also end up as well or better off even in income terms than they were because everyone can benefit from the overall efficiency gain. Where there are not true externalities (figure 2), the poor are made better off in a real income sense as the rich gain in utility terms by financing the necessary social programs. Any other approach is, by definition, either coercive or ultimately ineffective. There is consequently a fundamental logic to treating population programs as at one and the same time client-oriented social services and poverty programs.

Underlying this approach is the idea that fertility is endogenous, a rational decision by households given their opportunities and constraints. In order to elicit changes in behavior among the poor (whose

fertility tends to be higher than that of the rich), the poor must be treated as clients, and must be given reason to change.

The basic principle that parents who want more children must be compensated not to have them is at the core of welfare economics. It matters little whether the rationale for a population program is one of externalities, of unwanted fertility, or of improving income distribution. Such programs in the end must involve compensation, either directly or indirectly. Well designed programs, by our reckoning, are those that incorporate the criterion of keeping the poor at least as well off in their own eyes after they choose to have fewer children.

We should carefully rethink whether the level of resources devoted to these programs is adequate and whether the programs themselves are designed with the client's welfare in mind. The critical question for any population program or policy when welfare concerns are brought to the forefront is: Will the program help the poor to improve their lives after they have smaller families?

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